Electronic Version
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Claims

[c1] 1. A method for identifying a polymer, comprising providing in the polymer at least one tagging material wherein the tagging material comprises at least one organic fluorophore dye, or at least one inorganic fluorophore, or at least one organometallic fluorophore, or at least one semi-conducting luminescent nanoparticle, or combination thereof, wherein the tagging material has a temperature stability of at least about 350 °C and is present in a sufficient quantity such that the tagging material is detectible via a spectrofluorometer at an excitation wavelength in a range between about 100 nanometers and about 1100 nanometers.

[c2] 2. The method in accordance with claim 1, wherein the tagging material has a temperature stability of at least about 375 °C.

[c3] 3. The method in accordance with claim 1, wherein the tagging material has a temperature stability of at least about 400 °C.

[c4] 4. The method in accordance with claim 1, wherein the tagging material has an excitation wavelength in a range

between about 200 nanometers and about 1000 nanometers.

[c5] 5. The method in accordance with claim 4, wherein the tagging material has an excitation wavelength in a range between about 250 nanometers and about 950 nanometers.

[c6] 6. The method in accordance with claim 1, wherein the at least one fluorophore dye comprises perylenes.

[c7] 7. The method in accordance with claim 6, wherein the at least one fluorophore dye comprises anthra[2,1,9-def:6,5,10-d'e'f']diisoquinoline-1,3,8,10(2H,9H)-tetrone, 2,9-bis[2,6-bis(1-methyethyl)phenyl]-5,6,12,13-tetraphenoxy, or combinations thereof.

[c8] 8. The method in accordance with claim 1, wherein at least one fluorophore dye comprises a lanthanide complex.

[c9] 9. The method in accordance with claim 1, wherein the fluorophore is an anti-stokes shift dye.

[c10] 10. The method in accordance with claim 1, wherein at least one semi-conducting luminescent nanoparticle comprises CdS, ZnS, Cd_3P_2, PbS, or combinations

thereof.

[c11] 11. The method in accordance with claim 1, wherein at least one semi-conducting luminesent nanoparticle comprises rare earth aluminates comprising strontium aluminates doped with Europium and Dysprosium.

[c12] 12. The method in accordance with claim 1, wherein the tagging material is present in a range between about 10^{-18} and about 2 percent by weight of the total polymer.

[c13] 13. The method in accordance with claim 12, wherein the tagging material is present in a range between about 10^{-15} and about 0.5 percent by weight of the total polymer.

[c14] 14. The method in accordance with claim 13, wherein the tagging material is present in a range between about 10^{-12} and about 0.05 percent by weight of the total polymer.

[c15] 15. The method of claim 1, wherein the polymer comprises a thermoplastic polymer material.

[c16] 16. The method of claim 15, wherein the thermoplastic polymer material comprises polycarbonate.

[c17] 17. The method of claim 1, wherein the tagging material is incorporated into the polymer by coating, admixing,

blending, or copolymerization.

[c18] 18. The method of claim 1, wherein the polymer is used in a storage media for data.

[c19] 19. The method of claim 1, wherein the polymer contains a coloring material.

[c20] 20. The method in accordance with claim 1, wherein the tagging material has a temperature stability for a time period of less than about 10 minutes.

[c21] 21. The method in accordance with claim 1, wherein the tagging material has a temperature stability for a time period of less than about 1 minute.

[c22] 22. The method in accordance with claim 1, wherein the tagging material has a temperature stability for a time period of less than about 20 seconds.

[c23] 23. A method for identifying a polycarbonate, comprising providing in the polycarbonate at least one tagging material wherein the tagging material comprises a perylene, wherein the perylene has a temperature stability of at least about 350 °C, is present in a range between about 10^{-18} percent by weight and about 2 percent by weight of the total polycarbonate and is detectible via a spectrofluorometer at an excitation wavelength in a

range between about 100 nanometers and about 1100 nanometers.

[c24] 24. A polymer comprising a tagging material wherein the tagging material comprises at least one organic fluorophore dye, or at least one inorganic or organometallic fluorophore, or at least one semi-conducting luminescent nanoparticle, or combination thereof, wherein the tagging material has a temperature stability of at least about 350 °C and is present in a sufficient quantity such that the tagging material is detectible via a spectrofluorometer at an excitation wavelength in a range between about 100 nanometers and about 1100 nanometers.

[c25] 25. The polymer in accordance with claim 24, wherein the tagging material has a temperature stability of at least about 375 °C.

[c26] 26. The polymer in accordance with claim 24, wherein the tagging material has a temperature stability of at least about 400 °C.

[c27] 27. The polymer in accordance with claim 24, wherein the at least one fluorophore dye has an excitation wavelength in a range between about 200 nanometers and about 1000 nanometers.

[c28] 28. The polymer in accordance with claim 27, wherein

the at least one fluorophore dye has an excitation wavelength in a range between about 250 nanometers and about 950 nanometers.

[c29] 29. The polymer in accordance with claim 24, wherein the at least one fluorophore dye comprises perylenes.

[c30] 30. The polymer in accordance with claim 29, wherein the at least one fluorophore dye comprises anthra[2,1,9-def:6,5,10-d'e'f']diisoquinoline-1,3,8,10(2H,9H)-tetrone, 2,9-bis[2,6-bis(1-methyethyl)phenyl]-5,6,12,13-tetraphenoxy, or combinations thereof.

[c31] 31. The polymer in accordance with claim 24, wherein the at least one fluorophore dye comprises a lanthanide complex.

[c32] 32. The polymer in accordance with claim 24, wherein the fluorphore comprises an anti-stokes shift dye.

[c33] 33. The polymer in accordance with claim 24, wherein the at least one semi-conducting luminescent nanoparticle comprises CdS, ZnS, Cd_3P_2, PbS, or combinations thereof.

[c34] 34. The polymer in accordance with claim 24, wherein the at least one semi-conducting luminescent nanoparti-

cles comprises rare earth aluminates comprising strontium aluminates doped with Europium and Dysprosium.

[c35] 35. The polymer in accordance with claim 24, wherein the tagging material is present in a range between about 10^{-18} percent by weight and 2 percent by weight of the total polymer.

[c36] 36. The polymer in accordance with claim 35, wherein the tagging material is present in a range between about 10^{-15} percent by weight and about 0.5 percent by weight of total polymer.

[c37] 37. The polymer in accordance with claim 36, wherein the tagging material is present in a range between about 10^{-12} percent by weight and about 0.05 percent by weight of total polymer.

[c38] 38. The polymer in accordance with claim 24, wherein the polymer comprises a thermoplastic polymer material.

[c39] 39. The polymer in accordance with claim 38, wherein the thermoplastic polymer material comprises polycarbonate.

[c40] 40. The polymer in accordance with claim 24, wherein the tagging material is incorporated into the polymer by coating, admixing, blending, or copolymerization.

[c41] 41. The polymer in accordance with claim 24, wherein the polymer is used in a storage media for data.

[c42] 42. The polymer in accordance with claim 24 comprising a coloring material.

[c43] 43. The polymer in accordance with claim 24, wherein the tagging material has a temperature stability for a time period of less than about 10 minutes.

[c44] 44. The polymer in accordance with claim 24, wherein the tagging material has a temperature stability for a time period of less than about 1 minute.

[c45] 45. The polymer in accordance with claim 24, wherein the tagging material has a temperature stability for a time period of less than about 20 seconds.

[c46] 46. A polycarbonate comprising a perylene, wherein the perylene has a temperature stability of at least about 350 °C and is present in a range between about 10^{-18} percent by weight and about 2 percent by weight of the total polycarbonate and is detectible via a spectrofluorometer at an excitation wavelength in a range between about 100 nanometers and about 1100 nanometers.

[c47] 47. An article comprising a polymer wherein the polymer comprises at least one tagging material wherein the tag-

ging material comprises at least one organic fluorophore dye, or at least one semi-conducting luminescent nanoparticle, or combination thereof, wherein the tagging material has a temperature stability of at least about 350 °C and is present in a sufficient quantity such that the tagging material is detectible via a spectrofluorometer at an excitation wavelength in a range between about 100 nanometers and about 1100 nanometers.

[c48] 48. The article in accordance with claim 47, wherein the tagging material has a temperature stability of at least about 375 °C.

[c49] 49. The article in accordance with claim 47, wherein the tagging material has a temperature stability of at least about 400 °C.

[c50] 50. The article in accordance with claim 47, wherein the at least one fluorophore dye has an excitation wavelength in a range between about 200 nanometers and about 1000 nanometers.

[c51] 51. The article in accordance with claim 50, wherein the at least one fluorophore dye has an excitation wavelength in a range between about 250 nanometers and about 950 nanometers.

[c52] 52. The article in accordance with claim 47, wherein the

at least one fluorophore dye comprises perylenes.

[c53] 53. The article in accordance with claim 52, wherein the at least one fluorophore dye comprises anthra[2,1,9-def:6,5,10-d'e'f']diisoquinoline-1,3,8,10(2H,9H)-tetrone, 2,9-bis[2,6-bis(1-methyethyl)phenyl]-5,6,12,13-tetraphenoxy, or combinations thereof.

[c54] 54. The article in accordance with claim 47, wherein at least one fluorophore dye comprises a lanthanide complex.

[c55] 55. The article in accordance with claim 47, wherein the fluorophore is an anti-stokes shift dye.

[c56] 56. The article in accordance with claim 47, wherein at least one semi-conducting luminescent nanoparticle comprises CdS, ZnS, Cd_3P_2, PbS, or combinations thereof.

[c57] 57. The article in accordance with claim 47, wherein at least one semi-conducting luminescent nanoparticle comprises rare earth aluminates comprising strontium aluminates doped with Europium and Dysprosium.

[c58] 58. The article in accordance with claim 47, wherein the tagging material is present in a range between about 10^{-18}

to about 2 percent by weight of the total polymer.

[c59] 59. The article in accordance with claim 58, wherein the tagging material is present in a range between about 10^{-15} to about 0.5 percent by weight of the total polymer.

[c60] 60. The article in accordance with claim 59, wherein the tagging material is present in a range between about 10^{-12} to about 0.05 percent by weight of the total polymer.

[c61] 61. The article in accordance with claim 47, wherein the polymer comprises a thermoplastic polymer material.

[c62] 62. The article in accordance with claim 61, wherein the thermoplastic polymer material comprises polycarbonate.

[c63] 63. The article in accordance with claim 47, where in the tagging material is incorporated in to the polymer by coating, admixing, blending, or copolymerization.

[c64] 64. The article in accordance with claim 47, wherein the polymer is used in a storage media for data.

[c65] 65. The article in accordance with claim 47, wherein the polymer contains a coloring material.

[c66] 66. The article in accordance with claim 47, wherein the tagging material has a temperature stability for a time

period of less than about 10 minutes.

[c67] 67. The article in accordance with claim 47, wherein the tagging material has a temperature stability for a time period of less than about 1 minute.

[c68] 68. The article in accordance with claim 47, wherein the tagging material has a temperature stability for a time period of less than about 20 seconds.

[c69] 69. A storage medium for data comprising a polycarbonate wherein the polycarbonate comprises a perylene wherein the perylene has a temperature stability of at least about 350 °C, is present in a range between about 10^{-18} percent by weight and about 2 percent by weight of the total polycarbonate, and is detectable via a spectrofluorometer at an excitation wavelength in a range between about 100 nanometers and about 1100 nanometers.